New Jersey Department of Environmental Protection

Bureau of Discharge Prevention

A Guide to the Implementation of API 653 Tank Inspection, Repair,

Alteration and Reconstruction

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A Guide to the Implementation

of API 653

This guide serves as an overview & quick reference to the use of American Petroleum Institute Standard 653, (API 653) Tank Inspection, Repair, Alteration and Reconstruction, to show compliance with N.J.A.C.7:1E-2.2(a)4. and is not intended to replace the API 653 document The facility must follow the most recent edition of API 653 issued by the American

Petroleum Institute. Only carbon and low alloy steel storage tanks built to API 650 standard are covered by this standard. Plastic and fiberglass storage tanks are not addressed by this standard and therefore must follow the integrity testing and internal inspection procedures of N.J.A.C. 7:1E-2.2(a)4, or alternatives approved by the Department.

INTRODUCTION

This document has been prepared, along with the guidance document, "***A Guide to the Inspection and Testing of Aboveground Storage Tanks***" to help the regulated community better understand how to demonstrate compliance with N.J.A.C. 7:1E-2.2. As specified in N.J.A.C. 7:1E-2.2, owners or operators of a major facility are required to integrity test and internally inspect aboveground hazardous substance storage tanks, greater than 2000 gallons capacity, within 5 years of performing the initial integrity test, and every 5 years thereafter, unless the facility is complying with the requirements of API 653. The procedures and requirements which must be performed in order for a facility to be in conformance with API 653, and thus with N.J.A.C. 7:1E-2.2(a)4, are described in this document.

API 653 is a maintenance and inspection program developed by the American Petroleum Institute to provide for an ongoing assessment of a facility's storage tanks. A facility must follow all of the procedures for maintenance and inspections outlined in the API 653 standard and perform any repairs recommended by the Authorized Inspector in order to use API 653 to show compliance with the integrity testing requirements of N.J.A.C. 7:1E-2.2. Ultrasonic thickness (UT) tests performed to "API 653 standards" does not establish that a storage tank is in full compliance with API 653. It merely states that the procedures for performing that test were conducted following the protocol for UT testing under API 653.

ESTABLISHING AN API 653 PROGRAM

The first step is a file search to obtain the recorded history of the storage tank. This includes, but is not limited to, design specifications and drawings, as-built drawings, previous integrity testing results, repair and alteration workorders and specifications, etc. The intervals for performing the various API 653 inspections are based on calculating the corrosion rate of the tank shell and bottom plate. Once these calculations are performed, the time it will take for the shell and bottom plate to reach the minimum plate thickness can be extrapolated and the schedule for future inspections determined. The more information acquired for a particular tank, the more accurate the corrosion data will be.

Once the historical documentation of the tank is gathered, the next step is to have the Authorized Inspector evaluate the data and establish a testing schedule for each tank, taking into consideration the corrosion rate for the tank shell and bottom plate. It is at this step that a thorough search of a tank's history is helpful. When past information of the tank is not known, API 653 requires the use of conservative values, which could represent a significant penalty factor in calculating the minimum allowable thickness of the tank shell and bottom plate. Without the known corrosion rates, the interval for inspections is severely limited. In these cases, the external (API 653 - 4.3.2) and ultrasonic thickness inspections (API 653 - 4.3.3) must be conducted within 5 years and a full internal inspection must be conducted within 10 years since publication of the API 653 standard in December 1991.

INSPECTIONS

API 653 requires the facility to conduct 4 separate and distinct inspections for each storage tank:

1. Routine In-service Inspection (4.3.1) – performed on a monthly basis and includes a visual inspection of the tank's exterior surface checking for leaks, shell distortions, signs of settlement, corrosion and conditions of the foundation, paint coating, insulation and appurtenances. Facility personnel knowledgeable of facility operations, the tank and the characteristics of the product stored may conduct this inspection. (***Note:*** The routine in-service inspection is different from the DPCC/DCR visual inspection required per N.J.A.C. 7:1E-2.10. The DPCC/DCR inspections are required for storage tanks to ascertain the condition of the secondary containment systems and to check for leaking equipment. However, they may be combined, performed and documented concurrently.)

2. External Inspection (4.3.2) – A visual external inspection must be performed by an API 653 Authorized Inspector at least every 5 years or at the quarterly corrosion rate life of the shell, whichever time period is less.

3. Ultrasonic Thickness Inspection (4.3.3) – Ultrasonic thickness readings of the tank shell are used to determine the rate of uniform general corrosion while the tank is in service. An Authorized Inspector must evaluate the UT test data. The inspection frequency is driven by the corrosion rate of the tank shell. When the corrosion rate is not known, the maximum interval shall be five years. The maximum time between UT inspections in any case shall not exceed 15 years.

4. Internal Inspections (4.4) – All tanks shall be given a formal internal inspection at the intervals defined by API 653-4.4.2. The controlling factors used to determine the timing of internal inspections are the corrosion rate and minimal bottom plate thickness of the tank. The Authorized Inspector who is responsible for the evaluation of the tank must conduct a visual inspection of the interior of the tank and overview of the Non Destructive Examination and test results. For tanks with known corrosion rates and bottom plate thickness data, internal inspection intervals must be calculated by the Authorized Inspector. For new tanks, the actual bottom thickness shall be determined by inspection(s) within 10 years of tank operation to establish corrosion rates. For all other tanks, internal inspections are required by December 2001 at the latest, which is 10 years from the initial publication date of the API 653 standard. API 653 allows for alternative procedures, which must be determined by the Authorized Inspector and also must be outlined in the facility's maintenance and inspection program or storage tank description sections of their DPCC/DCR plan.

Note: Authorized Inspector qualifications are outlined in API 653-4.10 and Appendix D.

Additionally, all recommendations noted by the Authorized Inspector or contained in the inspection report must be addressed according to API 653 standards. These findings and repairs must be documented according to API 653 Sections 4.8 Records and 4.9 Reports.

RECORDKEEPING:

Recordkeeping of tank construction, inspection and repair data is the foundation of the API 653 inspection and maintenance program. Any past data that the facility has on the condition and operation of each tank shall be included as part of the recordkeeping requirements. In addition, records of the four inspection procedures outlined above must also be documented and retained for the life of the tank, as outlined in API 653 – 4.8 & 4.9. This information is to be used by the Authorized Inspector in evaluating the storage tanks and determining the corrosion rate for the tank shell, roof and bottom plate. The evaluation of the data is then used to schedule the next round of inspections required by API 653.

DPCC/DCR PLAN REQUIREMENTS

The facility is required to specify in their DPCC/DCR plan, as part of their storage tank description, the criteria for maintenance, repair and testing of storage tanks containing hazardous substances along with a detailed schedule for the integrity testing. The facility must prepare a schedule that includes dates (month & year) for the following: 1) external inspections, 2) in-service UT inspections and 3) internal inspections. In addition, in the description of visual inspections, the facility must include routine in-service inspections. The Authorized Inspector must determine testing and inspection dates and the facility must amend it's DPCC/DCR plan, as per N.J.A.C. 7:1E-4.8, to reflect all changes in their integrity testing and inspection program.

SUMMARY

This document is intended to show how API 653 can be an acceptable alternative to integrity testing procedures contained in N.J.A.C. 7:1E et seq. and how a facility can show compliance with N.J.A.C. 7:1E- 2.2(a)4 & 2.15(c). This document does not cover the complete program contained in API 653 and has been prepared to give a general overview of the requirements. It is not intended to replace API 653. For a facility to utilize API 653 as their tank inspection protocol, the facility must follow and be in conformance with **all** parts of API 653 and not just those items mentioned in this guidance document.